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September 13, 1993

\*NOT ADMITTED IN D.C.

Mr. William F. Caton  
Acting Secretary  
Federal Communications Commission  
1919 M Street, N.W.  
Room 222  
Washington, D.C. 20554

Re: GEN Docket No. 92-314 ET Docket No. 92-100  
Ex Parte Presentation

Dear Mr. Caton:

The attached Emergency Petition of Apple Computer, Inc. was submitted today to those persons listed on the attached Certificate of Service. Two copies of this Emergency Petition are provided for the public record, in accordance with Section 1.1206 of the Commission's Rules.

If there are any questions in this regard, please contact the undersigned.

Sincerely,



Mary Dent

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SEP 13 1993

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D. C. 20554

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

In the Matter of	)	
	)	GEN Docket No. 90-314
Amendment of the Commission's	)	ET Docket No. 92-100
Rules to Establish New Personal	)	
Communications Services	)	

To: The Commission

EMERGENCY PETITION

Apple Computer, Inc. ("Apple"), hereby submits this Emergency Petition in the above-referenced proceeding. The Commission recently has adopted its Third Report and Order and Memorandum Opinion and Order ("Third R&O") in ET Docket 92-9<sup>1</sup> and has, thereby, established the regulatory framework for use of the 2 GHz band by emerging technologies. This framework also affects decisions that must be made in the instant proceeding, which, it has been widely reported, the Commission intends to conclude at its September meeting.<sup>2</sup>

One of the most significant of the emerging technologies to be created in the 2 GHz band is wireless data personal communications, or Data-PCS. Certain elements of the Third R&O, however, so limit the future of Data-PCS that the Commission must take certain essential actions in this proceeding if Data-PCS is not to be still-born. In particular:

- The 1910-1930 MHz band should be allocated for the exclusive use of Data-PCS and certain "nomadic" voice devices, including consumer cordless telephones. Most of the band should be set aside for Data-PCS, while nomadic voice systems should be assured an adequate sub-allocation.

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<sup>1</sup> Adopted July 15, 1993, with full text released August 13, 1993.

<sup>2</sup> E.g., "Cellular and PCS Groups Trade Charges on Regulatory Roadblock," Communications Daily, at 1 (Aug. 12, 1993).

- No Data-PCS or other device should be permitted to use any part of the 1910-1930 MHz nomadic band until it is completely cleared of microwave stations nationwide.
- No system that is non-nomadic, and thus capable of being frequency-coordinated, should be permitted to use the 1910-1930 MHz nomadic band.
- An additional 20 MHz of unlicensed spectrum should be allocated adjacent to the 1910-1930 MHz nomadic band. Systems that can be frequency coordinated should be allowed to use this band upon explicit demonstration of site-specific frequency coordination to protect incumbent microwave users. Both voice and data systems should be permitted to use this coordinated band under a satisfactory "sharing etiquette."
- Two or more additional 10 MHz channels in the 1850-1990 MHz band should be reserved for at least five years and used to accommodate microwave incumbents from both licensed and unlicensed PCS frequencies. After five years, these bands should be made available for PCS, licensed or unlicensed, as the market requires.

These actions are discussed more fully below.

**I. The 1910-1930 MHz Band Must Be Allocated For The Exclusive Use Of "Nomadic" Devices.**

Now that the Commission has defined the regulatory framework in which PCS will be developed, the single most important decision the Commission must make regarding unlicensed devices is to allocate the more easily cleared part of the emerging technologies band, from 1910-1930 MHz, to technologies that cannot exist without band clearing.

Unlicensed, nomadic PCS applications, such as Data-PCS, provide by far the most beneficial opportunities for emerging technologies. However, by their very nomadic nature, they require nationwide cleared spectrum, as they can be used anywhere and present an interference threat to any microwave receiver

remaining in the band.<sup>3</sup> No "checkerboard" clearing or other localized coordination process overcomes that threat: the "last link" must be cleared nationwide before any truly nomadic device can be sold.

Of the 2 GHz spectrum proposed for emerging technologies, only the 1910-1930 MHz band offers any realistic potential for such nationwide clearing in any reasonable time period. Re-accommodating the comparatively small number of users<sup>4</sup> in the 1910-1930 MHz band is a daunting task, but it is possible, while rapid nationwide clearing of other bands is not.

The Commission should, therefore, allocate frequencies that can be cleared readily for nomadic devices and allocate frequencies for non-nomadic systems in bands where they can be deployed rapidly using frequency coordination techniques.

Two of the three categories of devices described in the Notice of Proposed Rulemaking and Tentative Decision ("NPRM") in this proceeding for the unlicensed PCS band generally will be nomadic: Data-PCS and cordless telephones.

#### A. Data-PCS

The most important unmet requirement for nomadic connectivity is for computer communications: Data-PCS. Data-PCS technology represents an opportunity to make vast amounts of information accessible to people at any time and in any place. Data-PCS is not simply an advance in the evolution of conventional telephony and does not duplicate any existing wireless service.

Vice President Gore has emphasized that "[t]he role of the federal government remains critical to the national information infrastructure: . . . to clarify the vision as it evolves, . . . [to] establish much higher thresholds of data

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<sup>3</sup> The Commission now "recogniz[es] that the entire band must be cleared of the incumbents to avoid potential interference before most unlicensed devices may be marketed generally. . . ." Third R&O at ¶ 24. This reflects a significant change from the earlier belief that spectrum sharing would be possible. *See, e.g.*, Notice of Proposed Rulemaking and Tentative Decision, GEN Docket No. 90-314, ET Docket No. 92-100, at ¶ 43 (rel. Aug. 14, 1992) ("We propose that unlicensed PCS operation be co-primary with Part 94 operations.").

<sup>4</sup> While data bases vary, there are approximately 436 transmitters in this 20 MHz band. Other similar portions of the emerging technologies band contain at least three times as many stations.

transmission, so that we can encourage the evolution of new classes of information services that are presently beyond our imagination."<sup>5</sup> Data-PCS is essential to this vision because it offers the only immediate way to extend the national information network to every person in every school and business, throughout every library, to every doctor and nurse, and to every research scientist. Data-PCS will constitute many of the on- and off-ramps of the "data highway."

To fulfill its promise, adequate spectrum must be allocated to Data-PCS from the outset; even the most conservative forecasts for the short-term spectrum requirements for Data-PCS exceed 20 MHz. The spectrum, moreover, must be made available quickly, without the impossible burden of relocating thousands of microwave stations, as would be required in the frequencies outside the 1910-1930 MHz band.

#### **B. Consumer Cordless Telephones/Key Systems**

In addition to Data-PCS, another category of unlicensed nomadic devices was anticipated in the Commission's NPRM: consumer cordless telephones, small business key systems and similar products.<sup>6</sup> As the Commission recognized in the Third R&O, it is impossible to frequency-coordinate the use of consumer and household cordless telephones, and some small business systems would share that attribute.<sup>7</sup> Their potential mobility distinguishes these devices from wireless PBXs and means that they, like Data-PCS, cannot be deployed prior to nationwide band clearing.

Unlike Data-PCS, however, these devices individually convey narrow-band information such as voice and telephony-rate data.<sup>8</sup> Even where there are many users, their cumulative bandwidth requirement will be only a fraction of

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<sup>5</sup> "Gore Discusses Changing Government, NAFTA, Technology," San Jose Mercury News, p. 14A (Sept. 11, 1993).

<sup>6</sup> As the Commission has been advised, entities developing some of these devices are under pressure to abandon their previous plans to exploit the ISM bands as a result of interference, making rapid availability of a 1910-1930 MHz nomadic band allocation even more vital. *See, e.g.,* GEN Docket 93-61 (filings of the "Part 15 Coalition" and its members).

<sup>7</sup> Third R&O at ¶ 19.

<sup>8</sup> By definition these devices are intended for connection to the PSTN, and their information bandwidth is limited by the characteristics of the network.

the bandwidth needed for data communications by a like number of computer users.<sup>9</sup>

The Commission, therefore, should divide the 1910-1930 MHz band into two sub-bands in proportion to the bandwidth utilization of data and voice users. Based upon a current ratio of approximately 8:1 in the bandwidth needed to serve a given number of users' data requirements for portable computers compared to such users' telephony requirements, 17.5 MHz of the 1910-1930 MHz nomadic band should be allocated to Data-PCS, and the remaining 2.5 MHz should be made available to a wide range of nomadic telephony devices. To facilitate multi-application devices, the allocation for voice systems should be adjacent to the band allocated for non-nomadic systems, which will be dominated initially by wireless PBXs.

**II. No Device Should Be Permitted To Use The 1910-1930 MHz Nomadic Band Until That Band Is Completely Cleared Of Microwave Stations, And No System That Can Be Frequency Coordinated Should Be Allowed To Use The Nomadic Band.**

Wireless PBXs are ready for commercial deployment today,<sup>10</sup> and they can be deployed in almost every part of the nation in bands that have not been cleared of microwave incumbents. There is no such opportunity for nomadic devices; they cannot be deployed until the last microwave link has been moved out of harm's way. PCS systems, therefore, that can be frequency coordinated with microwave users should not have access to the 1910-1930 MHz nomadic band but should have immediate access to an adjacent band of frequencies.

Unless use of the 1910-1930 MHz band is prohibited until it is cleared, that band, which affords the only practical opportunity for deployment of nomadic devices, will inevitably become consumed by wireless PBXs and by devices not anticipated in the NRPM. Such devices could include cordless telephones used as PCS tails to wireline telephone infrastructures and cable television systems,

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<sup>9</sup> See Reply Comments of Alexander Resources. GEN Docket No. 90-314, at 2, 15 (filed Jan. 14, 1991). These comments summarize a market study by Alexander Associates on "business in-building wireless communications systems (WCS)." Alexander used "information provided by Ericsson, GEC Plessey Telecommunications, and Qualcomm" to conclude that "applications would require a minimum of from 1.25 MHz to 3 MHz of exclusive, contiguous spectrum to function effectively."

<sup>10</sup> See Application of Northern Telecom Inc. for Part 5 Experimental License, Exhibit 1 at 1 (dated May 10, 1993) (requesting authority to install 1,000 wireless PBX systems).

which will be deployed in the unlicensed rather than licensed band because of auction costs and eligibility barriers to licensing. Such systems can in fact be frequency coordinated and, therefore, should be operated outside the nomadic band.

**III. A 20 MHz Coordinated Band, Contiguous With The 1910-1930 MHz Nomadic Band, Should Be Allocated For Non-Nomadic Unlicensed Systems.**

Just as it is imperative to protect the 1910-1930 MHz band until it is cleared, it is equally important to provide for immediate rollout of systems such as PBXs that employ fixed infrastructures and that can be deployed where they can be frequency-coordinated.

The band 1890-1910 MHz would be the optimum allocation for coordinated systems: such an allocation could be positioned directly between a licensed-PCS band and the unlicensed nomadic band at 1910-1930 MHz, thus facilitating multi-functional products.<sup>11</sup> Such a 20 MHz band could support a valuable combination of data and voice services as might be deployed on a coordinated basis. Any, or several, of the proposals for etiquettes for sharing such band usage<sup>12</sup> could be applied to such a band or parts thereof.

**IV. Deployment In The Non-Nomadic Unlicensed Band Prior To Band Clearing Should Be Allowed Only Upon Explicit Confirmation Of Frequency Coordination That Protects Incumbent Microwave Users.**

The Commission has stated that, ultimately, it intends to move all microwave operations from the entire 1850-1990 MHz band in order to develop it for new technologies.<sup>13</sup> Realistically, it will be many years, if ever, before there is any reason (and there are the financial resources) to relocate stations in many areas of the country, except those stations in the nomadic band which must be removed no matter where they are. Meanwhile, there is no reason to prevent deployment of limited-range systems such as wireless PBXs, that operate only within the area and the control of fixed base stations, whose locales and coverage

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<sup>11</sup> The initial European allocation for DECT (Digital European Cordless Telecommunications) would overlap this band and, thereby, offer a means whereby U.S. manufacturers would have a home market upon which to build exportable technologies.

<sup>12</sup> These proposals include those submitted by WINForum and Ericsson.

<sup>13</sup> Notice of Proposed Rulemaking, ET Docket No. 92-9, at ¶¶ 1, 19-20 (rel. Feb. 7, 1992).

areas can be firmly determined and maintained, in the bands established for such operation.<sup>14</sup>

There are proposals now before the Commission to provide some means of coordination management. These proposals, however, have not yet substantively addressed the realities of the process, and they have been emphatically challenged and, in some cases, repudiated by the microwave community and others.<sup>15</sup> Reliance upon consumer labels, complex and possibly breachable disabling schemes,<sup>16</sup> or unclear frequency coordination processes<sup>17</sup> will not be adequate; accordingly, additional work must be done to develop necessary details, reference standards, and coordination processes.

Instead of vague industry-selected and administered measures, manufacturers, users, dealers, and others who wish to turn on a transmitter in an occupied microwave band must be required to establish in advance, and to maintain, rigorous measures for interference avoidance through frequency coordination. Proper accountability for complying with the terms of the coordination process is one essential element of the coordination process. The only way to assure the interests of the microwave users is to give those users a voice in the process. Section 21.100 of the Commission's rules<sup>18</sup> which requires

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<sup>14</sup> Apple has strongly advocated such deployment, under conditions that include responsible assurance of microwave protection and only in conformance to the ultimate usage of the pertinent unlicensed band. See, e.g., Reply Comments of Apple Computer, Inc., GEN Docket No. 90-314, ET Docket No. 92-100, at n.10 (filed Jan. 8, 1993); Reply Comments of Apple Computer, Inc., ET Docket No. 92-9, at n.5 (filed Feb. 12, 1993).

<sup>15</sup> See generally Comments and Reply Comments filed in response to the "FCC Report and Recommendations of the Unlicensed PCS Ad Hoc Committee for 2 GHz Microwave Transition and Management" (dated May 14, 1993). For example, the UTAM Report and Recommendations proposed "incorporation of regulatory safeguards" and a "coordination process" to ensure non-interference to existing 2 GHz microwave operations, but these safeguards and processes are not yet fully developed. Similarly, while UTAM proposed using "high visibility labeling" to protect incumbent microwave systems, the adequacy of such labels has been questioned.

<sup>16</sup> See Reply Comments of UTAM at 19 (filed July 20, 1993) ("Manufacturers must be permitted to determine the most effective techniques [or disabling mechanisms], in terms of both cost and interference avoidance, for incorporation in their particular equipment.") (emphasis added).

<sup>17</sup> UTAM's Report and Recommendations states, "In order to ensure that existing 2 GHz microwave operations do not experience harmful interference, the Entity will maintain a coordinating database of microwave licensees and of non-nomadic unlicensed PCS deployments." UTAM Report and Recommendations at 12. UTAM has not yet provided additional details regarding its proposed "frequency coordination" process.

<sup>18</sup> See also §§ 22.100 and 94.63



"prior coordination," including participation by present users, should be used as a model for coordination and enforcement.<sup>19</sup>

**V. Two Or More 10 MHz Channels In The 1850-1990 MHz Band Should Be Reserved For At Least Five Years And Used To Accommodate Some Microwave Incumbents From Both Licensed And Unlicensed PCS Frequencies, In Order To Facilitate Rapid Deployment Of New Technologies.**

Apple has filed, contemporaneously herewith, a Petition for Reconsideration of several key elements of the Third R&O in order to foster the introduction of Data-PCS and other nomadic PCS technologies. There are, however, additional steps that the Commission should take in the instant proceeding to serve the same goal.

In particular, the Commission should set aside two or more 10 MHz reserve channels at 2 GHz for a five-year period to facilitate the introduction of both licensed and unlicensed PCS in the face of incumbent microwave stations' co-primary status. The need for such reserve channels goes beyond the band-clearing needs of those deploying nomadic devices. Both licensed PCS and non-nomadic unlicensed interests have found that they will need to employ a range of techniques, singly and in combination and including "frequency re-engineering,"<sup>20</sup> to address the problem of co-primary microwave incumbency.<sup>21</sup>

One particularly difficult problem, that of adjacent-channel interference problems resulting from wide IF filters in microwave receivers, pervades every present and intended use of the entire 1850-1990 MHz band. Because of this

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<sup>19</sup> Part 90, as reflected in § 90.175, is referenced by UTAM as an example of a successful frequency coordination "mechanism." This part generally does not require the advice and consent of other users of the band and so is substantially less rigorous than §§ 21.100, 22.100, and 94.63.

<sup>20</sup> Frequency re-engineering may involve changing, or retuning, the operating channel of any or all paths of a particular link. There can be many reasons for frequency re-engineering, some of which involve the concerns of a single operator, and others which reflect the need to make space for new links. Requests for such changes are routinely granted by the Commission in the same manner as a new application, in conformance with prevailing coordination evidence requirements.

<sup>21</sup> Some of these techniques place heavy burdens upon PCS base stations and mobile units to implement "avoidance" schemes. Others limit the technologies that can be used. Others, such as the one recently suggested by Comsearch, involve changing the microwave stations themselves (e.g., changing or shrouding antennas, changing polarization, or changing equipment from analog to digital).

problem, the Commission's frequency allocations for PCS cannot be made to reflect only their in-band use. Traditionally, frequency coordinators have been allowed to use a variety of tools to resolve adjacent- and co-channel interference problems. In some cases, a new station can be added most readily by frequency re-engineering, or retuning, some existing stations — a process made easier when a single licensee controls both the new and old stations or when all parties cooperate.

Similarly, "clearing" a band for PCS use will require consideration of the users of the adjacent bands as well as the in-channel incumbents. It may, in fact, be necessary to move particular stations not just out of, but away from, channels being taken up by new services. This could well make the whole microwave reaccommodation task more difficult than previously considered. For example, such measures may be required to make a satellite allocation more readily available over a large part of the country, or a licensed PCS allocation over a specific local area, as well as the 1910-1930 MHz nomadic band throughout the nation.

As the 1850-1990 MHz band is gradually "overtaken" by new technologies, the possibilities for exercising all of the routine interference-eliminating tools inevitably will become narrowed. Simple frequency moves may involve not only different licensees but different services altogether, with different motivations, resources, and timetables. No licensee or service can be the unwilling dumping ground for a displaced microwave station.

In order to maintain as much flexibility as possible to employ co-channel and adjacent channel interference-avoidance techniques between microwave incumbents and PCS users, for a period of five years the Commission should provide for two or more 10 MHz channels in the 2 GHz band that can be used to accommodate the in-band relocation of certain microwave stations. To be most useful, these reserve bands should be approximately midpoint in each half of the channel layout for the band, *e.g.* 1870 to 1880 MHz and 1950-1960 MHz.<sup>22</sup>

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<sup>22</sup> Such an allocation would permit, for example, retaining duplex split minimums and would more likely be within the tuning range of transmitter and receiver assemblies.

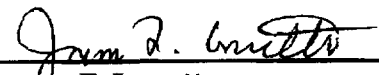
After five years, as the 1850-1990 MHz band becomes cleared by relocating microwave stations entirely out of the band, it will become possible to reclaim these channels for licensed or unlicensed PCS or other emerging technologies.

## **VI. Conclusion**

For the reasons stated above, the Commission should take immediate action to foster the introduction of Data-PCS, the most promising of the information technologies envisioned by the Commission's PCS proceeding. In the words of Vice-President Gore, these technologies offer the promise of "new classes of information services that are presently beyond our imagination." The Commission holds in its hands the future of this new technology.

Respectfully submitted,

Apple Computer, Inc.

  
\_\_\_\_\_  
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September 13, 1993

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## CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing Emergency Petition was served via first-class, postage-prepaid mail, or by hand delivery where indicated by an asterisk (\*), on this 13th day of September, 1993, to the parties listed below:

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